

REMARKS

These remarks are in response to the January 16, 2009 Office Action for the above patent application. Replacement drawings have been submitted to bring the drawings into compliance with the formalities of 37 C.F.R. 1.84. Claims 1, 3-4, 6-7, 9, 12-17, 20, 22-23, 25-26, 28, and 30-36 have been amended to more particularly point out and distinctly claim the Applicant's invention. Claims 1-40 remain pending in the application. No new matter has been added. Reconsideration of the claim rejections is respectfully requested in light of the following remarks.

Summary of Examiner Interview by Phone

The Applicant and the undersigned Agent thank Examiner Porter and Supervisory Examiner Layno for the phone interview given on Friday April 10, 2009. The 35 U.S.C. 101 rejection of independent claim 1 was discussed, and Applicant's proposed amendment to independent claim 1 was believed by the Applicant and indicated by the Examiner to meet the requirements of 35 U.S.C. 101.

Objection to the Drawings

The Examiner objected to the previously filed drawings on the basis that FIGS. 2, 5, and 6 had poor line quality and graphs with discontinuous lines. The Applicant has submitted a replacement set of drawings with this response in compliance with 37 C.F.R. 1.84 and 37 C.F.R. 1.121 to correct the noted deficiencies of the drawings. Accordingly, the Applicant respectfully requests that the objection to the drawings be withdrawn.

35 U.S.C. 112 Second Paragraph Claim Rejections

Claims 1-40 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. In particular:

Claim 1:

Examiner has pointed out that claim 1 is unclear because the origin of the first and second sets of ECG data is unclear. The Applicant has amended claim 1 to clarify that ECG signal data is acquired from a signal acquisition apparatus or from a data storage. The first set of ECG signal data is derived from the acquired ECG signal data. The first set of ECG signal data is inverted to derive the second set of ECG signal data. Therefore, if the ECG signal data is acquired from a signal acquisition apparatus, the claim does not limit the number of leads used to acquire the ECG signal data, the first set of ECG signal data is derived from the acquired ECG signal data, and the second set of ECG signal data is derived from the first set of ECG signal data.

The Examiner also stated that claim 1 did not point out how the data steps were derived. As explained above, independent claim 1 has been amended to clarify the derivations.

Claim 6:

The Examiner has pointed out that there is insufficient antecedent basis for "said interval" in claim 6. Claim 6 has been amended to depend from claim 5 instead of claim 1 in order to correct antecedent basis.

The Examiner also states that claim 6 omits a step to show how noise content is determined. Accordingly, claim 6 has been amended to include a step of "determining the noise content in a segment of the ECG signal deemed to be an isoelectric baseline segment."

Claim 7:

The Examiner has pointed out that there is insufficient antecedent basis for "an ensemble of ECG signals for each lead" in claim 7. The Applicant has amended claim 7 to clarify that the signal acquisition apparatus (defined in parent claim 1) comprises multiple ECG signal acquisition leads. The ECG signal data comprise an ensemble of ECG signals which have been acquired from the multiple ECG signal acquisition leads. Therefore, the following calculation of a median signal for each time from the ensemble of ECG signals from each lead to reduce low frequency baseline noise, as claimed in part of dependent claim 7, has been amended to have proper antecedent basis.

Claim 9:

The Examiner has pointed out that there is insufficient antecedent basis for "the isoelectric baseline" in claim 9. "The" has been replaced by "an" in the preceding amendments to provide proper antecedent basis.

The Examiner has stated that it is unclear what "rest of ECG" in claim 9 means. Applicant has amended claim 9 so the phrase is "the rest of the ECG signal", thereby clarifying. Examiner also points out that "rest" could define a variety of portions of the ECG. The Applicant agrees that the claims should be given their broadest interpretation.

Claim 12:

The Examiner has pointed out that the limitation "testing for presence of a single crossing of one isoelectric line" is deemed indefinite in claim 12. Applicant has amended claim 12 to clarify that testing is being done for the "presence of a single crossing of an isoelectric line by said first set of ECG data." Antecedent basis is corrected.

Claim 13:

The Examiner has pointed out that the limitation "or otherwise transformed" in claim 13 is unclear. The Applicant has deleted this limitation.

Claim 14:

The Examiner has pointed out that the limitation "such as" renders the claim indefinite. The Applicant has amended the claim to remove the "such as" language.

Claim 15:

The Examiner has stated that the limitation "ensembled orthogonal leads" is indefinite since it is allegedly unclear "how the orthogonal leads interface with the system." The Applicant respectfully points out that claim 15 is a method claim, not a system claim. That said, the Applicant sees that claim 15 needs clarification, and has amended the claim accordingly. Claim 15 is dependent on claim 14, which is dependent on claim 7. Claim 7 provides the antecedent basis for the amendments to claim 15 which now includes "summing squared amplitudes of the ensemble of ECG signals over all time instants to give a squared resultant vector of the ensemble

of ECG signals.” As the claims specify, the ensemble of ECG signals are acquired from the multiple ECG signal acquisition leads (which are just one example of a signal acquisition apparatus). In the case of claim 15, the multiple ECG signal acquisition leads comprise orthogonal leads. Applicant believes the amendments to claim 15 clarify how the orthogonal leads interface with the system.

The Examiner also has rejected claim 15 because allegedly “it is unclear if the ensembled orthogonal leads are the source of the first and second ECG data sets of claim 1.” The Applicant respectfully submits that the first and second ECG data sets of claim 1 have already been clarified in claim 1 and with respect to claim 1. Claim 15 does nothing to create doubt as to the meaning of the first and second ECG data sets, and therefore, the Applicant respectfully believes claim 15 particularly points out and distinctly claims the Applicant’s invention.

Claim 16:

The Examiner points out that the limitation “finding a beginning of the QT interval by an established method” is unclear in claim 16. The Applicant has amended claim 16 to remove “by an established method”. Furthermore, the Applicant has amended claim 16 to provide that the beginning of the QT interval is found from the median of the ensemble of ECG signals in order to clarify the Examiner’s question as to which ECG signal claim 16 applied to.

Claim 17:

The Examiner states that the limitation “calculating the QT interval by subtracting the beginning of the QT interval from the end of the T wave” is indefinite in claim 17 because it is unclear what QT interval and what T wave are being referred-to. Accordingly, the Applicant has amended claim 17 to clarify that the beginning of the QT interval is obtained from the median of the ensemble of ECG signals, and that the T wave is the one determined in step (d) of claim 1.

Claims 2-5, 8, 10-11, and 18-19:

Claims 2-5, 8, 10-11, and 18-19 stand rejected under 35 U.S.C. 112 as being dependent on a previously rejected claim. Claims 2-5, 8, 10-11, and 18-19 are directly or indirectly dependent on one or more of claims 1, 6-7, 9, and 12-17, the features of which have been discussed above. Based on the amendments to claims 1, 6-7, 9, and 12-17 to correct the 35

U.S.C. 112-related issues, the resultant 35 U.S.C. 112 rejections of dependent claims 2-5, 8, 10-11, and 18-19 should no longer apply.

Claims 20-40:

As stated in the office action, "Claims 20-40 contain similar issues of indefiniteness as claims 1-17 and require correction and clarification." The Applicant has made corresponding amendments to claims 20, 22-23, 25-26, 28, and 30-36 which more particularly point out and distinctly claim the Applicant's invention and correct any 35 U.S.C. 112 issues.

In Summary:

Based on the amended claims and for at least the above reasons, the Applicant believes the 35 U.S.C. 112, second paragraph, rejections against claims 1-40 are no longer valid. Therefore, the Applicant respectfully requests that the 35 U.S.C. 112, second paragraph rejections against claims 1-40 be withdrawn.

35 U.S.C. 101 Rejection

Claims 1-19 stand rejected under 35 U.S.C. 101 as allegedly being directed to non-statutory subject matter. Claims 2-19 are directly or indirectly dependent on independent claim 1. Applicant has amended independent claim 1 to clarify that ECG signal data is acquired from a signal acquisition apparatus or from a data storage. Furthermore, the claim 1 is now amended to specify that the deriving, inverting, and determining steps are performed using an electronic system. Support for the term "electronic system" and its functionality can be found in the embodiment of an electronic system 40 illustrated in the Applicant's FIG. 7.

For at least the above reasons, independent claim 1 is believed to encompass statutory subject matter which is eligible for patenting according to 35 U.S.C. 101 and applicable judicial interpretations of that statute. Similarly, dependent claims 2-19 are believed to encompass statutory subject matter which is eligible for patenting according to 35 U.S.C. 101 and applicable judicial interpretations of that statute, based at least on the statutory subject matter of their base claim. Therefore, the Applicant respectfully requests that the 35 U.S.C. 101 rejection against claims 1-19 be withdrawn.

CONCLUSION

Claims 1-40 remain in the application and are believed to be in a condition for allowance.
Reconsideration and a notice of allowance pertaining to these claims is respectfully requested.

Respectfully submitted,

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